REMARKS/ARGUMENTS

Favorable consideration of this application, as presently amended and in light of the following discussion, is respectfully requested.

Claims 1-16 are pending, with Claims 1-16 amended by the present amendment.

In the Official Action, the Abstract was objected to; Claim 1 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell et al. ("Diversity Considerations for MC-CDMA Systems in Mobile Communications," IEEE, 1996, pp. 131-135, hereinafter Schnell) in view of Bhatoolaul et al. (U.S. Patent Publication No. 2001/0017881, hereinafter Bhatoolaul) and Ramberg et al. (U.S. Patent Publication No. 2001/0050948, hereinafter Ramberg); Claim 2 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell, Bhatoolaul and Ramberg in view of Dunn et al. (U.S. Patent No. 4,761,796, hereinafter Dunn); Claims 3-5 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell in view of Bhatoolaul, Ramberg and Brunel et al. ("Euclidean Space Lattice Decoding for Joint Detection in CDMA Systems," IEEE, 1999, p. 129, hereinafter Brunel); Claims 6-7 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell in view of Bhatoolaul and Ramberg in view of Viterbo et al. ("A Universal Lattice Code Decoder for Fading Channels," IEEE, 1999, pp. 1639-1642, hereinafter Viterbo); Claims 8-9 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell in view of Bhatoolaul and Ramberg in view of Lupas et al. ("Linear Multiuser Detectors for Synchronous Code-Division Multiple-Access Channels," IEEE, 1989, pp. 123-136, hereinafter Lupas); Claim 10 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell in view of Bhatoolaul and Ramberg in view of Adoul et al. ("Nearest Neighbor Algorithm for Spherical Codes from the Leech Lattice," IEEE, 1988, pp. 1188-1202, hereinafter Adoul); Claim 11 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell in view of Bhatoolaul and Ramberg in view of Mottier (U.S. Patent Publication

No. 2002/0072336); Claim 12 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell in view of Bhatoolaul and Ramberg in view of Kanemoto et al. (U.S. Patent Publication No. 2003/0012269, hereinafter Kanemoto); Claim 13 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell in view of Bhatoolaul and Ramberg in view of Brunel; Claim 14 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell in view of Bhatoolaul, Ramberg and Mottier in view of Song et al. ("Subspace Blind Detection of Asynchronous CDMA Signals in Multipath Channels," IEEE, 1999, pp. 21-24, hereinafter Song); Claim 15 was rejected for unstated reasons; and Claim 16 was rejected under 35 U.S.C. § 103(a) as being unpatentable over Schnell, Bhatoolaul, Ramberg and Brunel.

Claims 1-16 are amended cosmetically without the introduction of new matter.

Briefly recapitulating, Claim 1 is directed to a method of detecting a plurality of symbols transmitted by or for a plurality of k users. Each symbol belongs to a modulation constellation and is the subject of a spectral spreading by means of a spreading sequence. The method includes a filtering step adapted for supplying a complex vector $(y(i), \tilde{y}(i))$ characteristic of the received signal. The complex vector is decomposed into a first vector $(y^R(i), \tilde{y}^R(i))$ and a second vector $(y^I(i), \tilde{y}^I(i))$. At least the closest neighbors of the first and second vectors are sought within a lattice of points (Λ,Ω) generated by the modulation constellations. The transmitted symbols are estimated from the components of the closest neighbors.

Schnell describes multicarrier CMDA (MC-CDMA) transmitter that uses binary data symbols which are multiplied bit-synchronously with a user specific spreading sequence. The data modulated spreading sequences of all users are added chip-synchronously. After a serial to parallel conversion the components of the data modulated spreading sequences are interpreted as complex frequency values of the subcarriers. Various modulation schemes can

be used resulting in complex-valued components of the data modulated spreading sequences. A transmission symbol s(t) is obtained by a OFDM operation. The OFDM operation includes an Inverse Discrete Fourier Transform followed by a parallel to serial conversion and low pass filtering.

Schnell goes on to describe a MC-CDMA receiver in Figure 2. In the receiver, the received signal r(t) is sampled and the inverse OFDM operation is performed, i.e., serial to parallel conversion followed by a DFT. If a frequency interleaver is applied at the transfer site, a frequency deinterleaver has to be applied with the receiver before parallel to serial conversion. A received vector is passed to an equalization detection unit where an estimate of the transmit data symbol of user i is produced. On page 135, Schnell describes that each transmission vector leads to a noise-free receiving vector. The possible transmission pattern is deduced by minimizing the squared Euclidean distance between a received, noise-corrupted vector and the hypothetical noise-free receiving vector.

As acknowledged in the Official Action, Schnell is silent about decomposing the complex vector into first and second vectors, and about the symbols belonging to a modulation constellation from which a search lattice is formed. The Official Action goes on to assert Bhatoolaul as disclosing a spreading sequence comprising a first and second vector.

Bhatoolaul describes a receiver in a code division multiple access communication system employing a preamble detector for random access channels. The random access channels may use orthogonal Gold code (OGC) sequences for preamble signature sequences and/or spreading of the preamble signature sequence with OGC sequences. The Official Action cites Bhatoolaul, paragraph 16, as being pertinent to Applicants' claimed invention. Paragraph 16 recites that for some exemplary embodiments, either the spreading sequence or preamble sequence is selected from the OGC set formed from first and second sequence

vectors, wherein the OGC set is generated from the first sequence vector in a cyclic shift matrix of a second sequence vector.

However, contrary to the Official Action, the first and second vectors of Bhatoolaul are not derived from a common complex vector as recited in Applicants' claim (said complex vector is decomposed into a first vector and a second vector). Paragraphs 33 through 41 of Bhatoolaul describe in detail how the OGC set is created. Furthermore, paragraphs 33 through 41 are directed to a transmitter and not a receiver, as recited in Applicants' claim. However, for argument's sake, Applicants note that Bhatoolaul recites "The OGC set is produced by two m-sequences a and b given in equation 1. The a sequence is created by a polynomial as shown in equation 3. The b sequence is created in a matrix operation as shown in equation 4, resulting in the polynomial shown in equation 5." Equations 3 and 5 of Bhatoolaul clearly show that sequences a and b are ***independent and unrelated*** sequences and, thus do not correspond to Applicants' claimed first and second vectors which are ***decomposed from a common complex vector***. Thus, contrary to the Official Action, both Schnell and Bhatoolaul fail to describe or suggest features recited in Applicants' independent claims. Applicants have considered the remaining applied references and submit this references do not cure the deficiencies of Schnell and Bhatoolaul.

MPEP §706.02(j) notes that to establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. Also, the teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck,* 947 F.2d 488, 20

USPQ2d 1438 (Fed. Cir. 1991). Without addressing the first two prongs of the test of obviousness, Applicants submit that the Official Action does not present a *prima facie* case of obviousness because both Schnell and Bhatoolaul fail to disclose all the features of Applicants' claimed invention.

Accordingly, in view of the present amendment and in light of the previous discussion, Applicants respectfully submit that the present application is in condition for allowance and respectfully request an early and favorable action to that effect.

Respectfully submitted,

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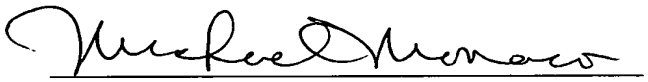

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